



# University of HUDDERSFIELD

## University of Huddersfield Repository

Bonner, John V.H., Renshaw, Tony and Wilson, Andrew

Observations on Situated Design, Theoretical Perspectives and Measurement of Player Experiences in Location Aware Games

### Original Citation

Bonner, John V.H., Renshaw, Tony and Wilson, Andrew (2008) Observations on Situated Design, Theoretical Perspectives and Measurement of Player Experiences in Location Aware Games. In: HCI2008 Conference (Human Computer Interaction), 1st - 5th September 2008, Liverpool, UK.

This version is available at <http://eprints.hud.ac.uk/id/eprint/4309/>

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: [E.mailbox@hud.ac.uk](mailto:E.mailbox@hud.ac.uk).

<http://eprints.hud.ac.uk/>

## Observations on Situated Design, Theoretical Perspectives and Measurement of Player Experiences in Location

### Aware Games

John Bonner	Tony Renshaw	Andrew Wilson
Live: lab	Usability North	Blink Ltd and D.R.U
School of Computing	Faculty of Information and	
	Technology	
University of Huddersfield	Leeds Metropolitan University	University of Huddersfield
00441 484 47293	0044113 2838608	00447980 224927
j.v.bonner@hud.ac.uk	T.Renshaw@leedsmet.ac.uk	andrew@blinkmedia.org



## **ABSTRACT**

Dissatisfied with the inefficiency and inadequacy of the “learning from experience” methodology in determining user reaction to their location-aware games, Blink approached two local universities, experienced in evaluation techniques deployed in human computer interaction, to form a partnership to address the evaluation of their creations. In this paper we present two examples of Blink’s previous work to show the limitations of the common sense approach to evaluation as applied to the design of location aware events. Many unanswered questions relating to the gauging of user experiences are enumerated as the product of reflection on the experiences gained as a result of these location-aware games implementations. We then touch briefly on a theoretical discussion of the nature of these events, before introducing some proposed heuristics, informed by previous experience and theoretical discussion. These heuristics will be used in conducting a more structured evaluation of the next event, taking place in Autumn 2008.

## **General Terms**

Human Factors

## **Keywords**

Design, evaluation, locations aware, narrative, games, play.

## **INTRODUCTION**

Blink [2] is an arts organisation with a track record of developing location aware events stretching back to 2003. Events designed and implemented by Blink have been deployed at venues ranging from city streets to museums, family holiday camps, historic ruins and office buildings, and have run over time frames lasting from a few days to ongoing events with no designated end point. The portable technologies employed have included: mobile phones, SMS, printed paper, tablet PCs fitted with RFID readers, and RFID readers embedded in objects. A key element uniting all save one of these events is that they include “user generated content” (UGC), that is, they invite the participant to add to a story or archive.

This track record has generated plenty of practical experience, but the context in which these events have been funded, designed and deployed, often as “site specific art”, has meant there has been little structured evaluation from an HCI perspective, beyond common sense observations used to inform subsequent events. The evaluation process to date has been based on feedback from participants and game administrators and has been used to inform the development of the next game. This lack of evaluation means that important lessons may have been missed, so in order to learn as much as possible from each event, Blink have begun a partnership with Huddersfield (Live:Lab) and Leeds Metropolitan (Usability North) Universities to evaluate future events.

Forming this partnership has led to discussions not only of the best methods of evaluation but also the nature of what is being evaluated: are these events games, or narratives, or as yet undefined playful experiences? Although much of usability evaluation can be considered common sense the authors believe that the time is right for the establishment a sound theoretical basis for future evaluations of this genre of game. This paper describes the first steps towards this strategy.

Descriptions of two location aware games that have actually been implemented and subjected to the acid test of public opinion follow in section 2. Section 3 describes the limitations of common sense based evaluations that took place and why such evaluations may not go far enough to provide sufficient information on the gamers’ experiences. The fourth section describes a basis upon which a more theoretically based set of evaluation measures can be built. The final section discusses future areas of research.

## **EXAMPLES OF LOCATION-AWARE GAME IMPLEMENTATIONS**

## 1 Genie

One of Blink's larger location aware projects was Genie, a 4 day trial at a Science Adventure Park called MAGNA in Rotherham, South Yorkshire. Groups of children aged 9-10, visiting both as part of school trips and as family groups, were asked to help find and set free genies trapped by Mardi, an evil wizard, in objects around the building. The presence of a Genie is marked by a "secret sign" which is in fact an RFID tag which triggers an interaction with one of the genies through a 'Magic Mirror' (a tablet PC with an RFID reader). As well as trapping the genies, Mardi has stolen their stories and memories. The Genie talks to the child through text displayed on the Magic Mirror, and asks questions about itself and its world. These questions prompt the child to create the missing memories that Mardi has stolen. The children respond by writing and drawing on the Magic Mirror giving the genie new memories. The interaction design of the game was deliberately created to allow the development of a non-linear narrative thus removing the need to follow a predefined and designated route. This was, however, unpopular with the parents and teachers responsible for managing and supporting the children through this creative writing experience, as they preferred, for safety reasons, to keep the children together and have them follow a single route through the building. The tablet PCs proved difficult for the children to carry and difficult for the museum to maintain and it quickly emerged by means of observation and equipment failure rates that they were an inappropriate mobile device. This practical difficulty forced the search for an alternative and more suitable device. Therefore in the following study (Echo), mobile phones were used in preference to the PC tablets. Nevertheless, many of the children's comments on the experience as they played the game were positive and they reported enjoyment in communicating with the 'genie' character and happily suspended disbelief about its real existence.

## 2 Echo

The Genie event provided important interaction design lessons for a subsequent project that was carried out over the Summer 2007. This second project, Echo, was devised in response to a commission from the Institute of Physics to develop a location aware event that would interest children in the physics of fairground rides at Butlins holiday camps. Using lessons learnt from the previous project, mobile phones were used to create an interactive game. A short booklet was produced with a central character called 'Echo' who visits Earth from a far away planet. Echo is keen to learn about how the planet works and needs information in order to get home for tea! In order to communicate with Echo, children send and receive text messages from the character.

Participation patterns recorded showed that uptake of the game was initially very high but fell to zero within a few weeks, but then picked up towards the end of the holiday period. This is thought to have been because although the booklets were handed out in the early weeks, they were then forgotten about. However, after some prompting, the booklets were again promoted to new families at the end of the holiday period. The data revealed the importance of staff support and encouragement to engage with the game and booklet. At the request of the client the game and guidebook were evaluated at two of the three Butlins sites and attracted 65 participants of which 46 completed the game. User and Butlin's staff interviews assessed the effectiveness of the game in providing a positive experience of physics for the Butlins holiday makers and implementation issues experienced. It was estimated that around 200 participants would be interested in playing the game but only just over a quarter of this target was achieved. Several reasons were attributed to this:

- a lack of a coordinated integration with other activities
- no clear explanation about the game during family induction sessions
- little tangible incentive to participate, as rewards for completion were not generally regarded as being worthwhile,
- wariness of using texting due to uncertain network costs and some parental concern over

their children communicating with an unknown character.

Completers of the game generally reported positive experiences of the game and its intended purpose and enjoyed an activity involving the whole family. However retaining interest for the whole family was often difficult, older children found it unchallenging and unsuitable for their own age. Participants were critical of the game when comparing its perceived value against other competing activities in the holiday camp. Some thought exploration through texting, rather than through active experiential learning, lessened the overall impact of the intended message. Non-completers did not find the game engaging enough and abandoned it due to the lure of other activities, rain, or poor completion incentives. Many of the participants wanted to meet the character and thought this would increase interest and engagement with the game.

## LIMITATION OF EVALUATIONS

### 1 The Common Sense Approach

Evaluation criteria limited the scope of the evaluations undertaken for Genie and Echo. This reflected the context in which the events were designed: in the case of Genie, the evaluation asked, by means of questionnaires and interviews, whether the event was useful to classroom teachers and children on a school trip to a museum; in the case of Echo, the event was designed in response to a commission to interest children in physics, and quite reasonably the clients wanted to know if it had succeeded in that narrow objective. While it was useful to measure the success or failure of the events against these targets, the evaluation reports did not provide much help in devising future location aware events. Common sense observation was still a more valuable design tool. More importantly, these limited evaluations did not address the most interesting questions about designing location aware events, for example: did the environment play a role in the children's creative writing style and content? Would a different environment have influenced what was written? Was there a suspension of disbelief? Was suspension of disbelief more or less likely when interacting with a fictional character using multi-media on a tablet PC, or by SMS on a mobile phone?

### 2 3.2 Games and Play Theories

Location aware games are often developed in educational contexts, including enhanced tourist trails, but there is no reason why they should be limited to these contexts, or evaluated against educational targets. If Blink's location aware events are to be evaluated on their own terms, it seems necessary to take a step back and ask: "What are they?" The most obvious answer, especially given the title of the workshop, is that they are games. Salen and Zimmerman[7] provide a comparison of definitions of games and differentiate between games and play seeing games as a subset of play. Of the definitions cited, Costikyan comes close to a definition which seems to fit the activities described in this paper:

*"A game is a form of art in which participants, termed players, make decisions in order to manage resources through game tokens in pursuit of a goal"*

Costikyan, G in Salen et al. p78

Gonzalo Frasca [3] also differentiates between play and games, and makes the distinction based not on whether they have rules. Games are a kind of play with a winner and loser, whereas play, is:

*"prodigality of physical or mental activity which has no immediate useful objective, and whose only reason to be is based in the pleasure experienced by the player."*

Frasca, G

Both Genie and Echo are examples of play in that both fulfill Frasca's definition of "prodigality of effort", in that there are no winners and losers. However, an end point is not always essential as is demonstrated by the Blink event "Free Manchester's Monsters". Using "self reported position" [1], based on choices made from the participants' "mental maps" as defined by Lynch[4], the event simply invites participants to use a text message to create a monster that lives in their favourite, or least favourite, location in the city. These monsters can then be retrieved by other people with a similar mental model of Manchester, again by text message, simply for the

satisfaction of doing so.

So according to Frasca this paper is discussing play under the generic heading of location aware games. This is an important distinction as it may have a profound impact on the expectations of the participants and consequently their evaluation of their experiences.

When considering paidea Frasca argues that it “can be related to the narrative setting.” Clearly “setting” is an important element of location-aware play, given that the setting is the real 3D world, and enhancing the setting for its own sake rather than to win or lose certainly describes, for example, GPS enabled audio tours.

These concepts give rise to numerous questions: many events have narratives, so what makes for a good or bad narrative in this context? Does a rich integration of place and narrative, making use of shared features of citizens’ mental maps, generate a more engaging and satisfying location aware event? How might this differ for tourists and residents? Are location aware events satisfying because they re-draw, or enrich, participants’ mental maps? How does the technology used to deliver location awareness and content integrate with aesthetic considerations: is a narrative more “believable” or “immediate” delivered on a participant’s own mobile phone than on a tablet PC borrowed from event administrators?

Other researchers who have influenced the authors’ approach to this problem are Monk, Blythe and Overbeeke [5]. Monk et al. (2003) hypothesize that aesthetics can affect perceptions of usability and will therefore influence participants’ evaluation of their experience. So what are aesthetics in location aware play and how can we evaluate them? Is presence a form of aesthetics: will an event that delivers a strong sense of presence be rated as engaging and satisfying?

## **HEURISTICS FOR EVALUATION**

Table 1. Proposed Heuristics for the Evaluation of Location-aware Games

To assist the authors to address the many questions raised in section 3, and potentially many more as yet undiscovered, the authors decided to develop the framework described by Andrew Monk and his associates [5] and apply it the specific context of play in location aware games. In this work a structured approach is advocated to what is a complex multifaceted newly emerging area of interest in human computer interaction. They argue that user experience should be analysed holistically within a framework comprising of four inextricably linked elements: compositional (e.g. the physical structure of the experience), sensual (e.g. the look and feel of the physical elements), emotional (e.g. calls upon the gamers’ empathies) and spatio-temporal (e.g. the events which happen to the gamer within the confines of the event). Their work discusses each of these in detail but here only brief examples can be given.

The approach to this topic that might be taken by Psychologists is to examine each element of experience and rigorously ascertain and measure its effect. The downside of such an approach is that the human interaction with the experiences being discussed here are complex and rife with

possible interactions.

The examples of events described in previous sections of the current paper take the opposite approach. Events are first experienced and then attempts are made to gauge experiences. The downside of this approach is that the isolation of any one causal factor made be difficult. The upside is that events can be organised and experience had by members of the public.

Table 1 lists the factors which, on the basis of the experiences described above, can be used as heuristics for the organisation and management of location aware games. It also shows how the heuristics falls within the four strands of experience as described by Monk et al (2003).

It makes at least economic sense to assess how well an event meets these requirements. Some ideas as to how best to evaluate a location aware game's performance against these heuristics is given below:

- < The number of players attracted within a given time against those budgeted.
- < The players' self assessed scores for each key element of their experience derived by asking them to complete a basic questionnaire at the end of a game.
- < If they are asked to interact with technology then the number of instances of interaction, their accuracy/appropriateness compared with expectations should be determined
- < Use the web to collect feedback from players possibly for a reward.

## **FUTURE RESEARCH**

The next Blink location-aware event will be called Five Trees Forest. Five Trees Forest has again been designed based on observation and common sense evaluation of previous events, but will be augmented with the heuristics described in the preceding section.

The Five Tree Forest event will use Near Field Communication enabled mobile phones to try and combine the UGC element of Genie and the usefulness of RFID as a positioning technology. It is proposed to determine whether the familiarity of SMS, the ubiquity of the mobile phone and their ease of use relative to tablet PCs, enhances suspension of disbelief when interacting with fictional characters.

Many questions remain unanswered and the authors are confident that many more will emerge as the partnership between Blink, Live:lab and Usability North develops. Working together the intention is to use our practical experiences to develop theoretical models describing participant interactions with location-aware technologies through play or games, and develop the appropriate, possibly new, evaluation techniques required to evaluate players' experiences in this genre of game play.

## **REFERENCES**

1. Benford, S., Seager, W., Flintham, M., Anastasi, R., Rowland, D., Humble, J., Stanton, D., Bowers, J., Tandavanitj, N., Adams, M., Row Farr, J., Oldroyd, A. and Sutton J. (2004) *The Error of our Ways: The experience of Self-Reported Position in a Location-Based Game*. *The 6th International Conference on Ubiquitous Computing*. (UbiComp 2004). Nottingham, September 2004. Springer/ACM, pp 70-87.
2. [www.blinkmedia.org](http://www.blinkmedia.org)
3. Frasca, G., *Ludology Meets Narratology: Similitude and difference between (video)games and narrative*. <http://www.ludology.org/articles/ludology.htm>
4. Lynch, K., *The Image of the City*, The MIT Press, 1960.
5. Monk, A., Blythe, M. and Overbeeke, C. *Making sense of Experience*. Kluwer, 2003



6. Monk, A.F. and Lelos, K. (2007) Changing only the aesthetic features of a domestic product can affect its apparent usability. In Venkatesh, A., Gonzalvez, T., Monk, A., Buckner, B.(ed.s) *Home informatics and telematics: ICT for the next billion*. Proceedings of HOIT 2007, Chennai, India. New York: Springer, pp. 221-234.
7. Salen,K;Zimmerman,E. *Rules of Play*, The MIT Press, 2004.





Published by the British Computer Society

Heuristic	Framework Element	Notes
The event needs to be targeted at/marketed to, the right participants .	Emotional	Users will come with their own experiences, skills and knowledge which will influence their reaction to the event. So they need to be attracted to the "right" event for them.
The event should be planned: including a statement of objectives, location, opening times, duration of experience, anticipated problems and their solution.	Compositional / spatio-temporal	Players will be exposed to a wide range of stimuli and experiences before, during and after game play. Starting with the advanced publicity through their trip to the event, their reception and briefings.
There should be a consistent theme throughout the	Emotion/sensual	Thematic consistency is required across the advanced publicity

experience.		through to the actual venue itself.
The event has to do everything it can to make the sensations tell a consistent story.	Sensual	Players will be using all their senses to make sense of things.
The environment is not to be inherently dangerous and in keeping with the capabilities of the players.	Compositional	
Designs of both the environment and any equipment used by the players should to be aesthetically pleasing.	Emotion/sensual	Research (Monk et al, 2007) shows that aesthetics influence perceptions of usability
The technology must work, be accessible and usable.	Compositional	Many of the accepted usability heuristics will apply including ease of learning